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An overview of prehistoric and early historic settlement, topography, and maritime connections on Lastovo Island, Croatia

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Book Section

Originally published at:

Della Casa, Philippe; Bass, Bryon; Katunarić, Tea; Kirigin, Branko; Radić, Dinko (2009). An overview of prehistoric and early historic settlement, topography, and maritime connections on Lastovo Island, Croatia. In: Forenbaher, Stašo. A connecting sea: maritime interaction in Adriatic prehistory. Oxford: Archaeopress, 113-136.

A Connecting Sea: Maritime Interaction in Adriatic Prehistory

Edited by

Stašo Forenbaher

BAR International Series 2037
2009

This title published by

Archaeopress
Publishers of British Archaeological Reports
Gordon House
276 Banbury Road
Oxford OX2 7ED
England
bar@archaeopress.com
www.archaeopress.com

BAR S2037

A Connecting Sea: Maritime Interaction in Adriatic Prehistory

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ISBN 978 1 4073 0614 8

Printed in England by Blenheim Colour Ltd

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Oxford
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AN OVERVIEW OF PREHISTORIC AND EARLY HISTORIC SETTLEMENT, TOPOGRAPHY, AND MARITIME CONNECTIONS ON LASTOVO ISLAND, CROATIA

Philippe Della Casa, Bryon Bass, Tea Katunarić, Branko Kirigin and Dinko Radić

The Augusta Insula Project focuses on the Croatian island of Lastovo. These investigations are part of ongoing archaeological and interdisciplinary research in the southern Dalmatian archipelago conducted under the aegis of the Korčula Archaeology Research Group (KARG). Field studies focus on the application of heritage management practices pertinent to the island's archaeological and historical resources. The first season's research (2001) consisted of preliminary bibliographic studies and field survey, while the second field season (2003) comprised limited subsurface archaeological testing at the localities of Kaštel and Lučica. The third season (2007) focused on more intensive field survey, testing at the Sozanj site, informant interviews, and data collection. A GIS database has been developed to examine the inter-relationships of the sites, and their connections to the regional prehistoric and protohistoric coastal marine setting. The project is similar in scope to the Adriatic Island Project. Eventually, a joint database will enable the study of a large group of islands. Such a common data collection approach would be unique to Mediterranean archaeological research.

Keywords: Bronze Age, Dalmatia, GIS analysis, Graeco-Roman period, Iron Age, Pottery, Radiocarbon dates, Survey

Introduction

Lastovo lies approximately 30 nautical miles off the Dalmatian coast, within an archipelago of 46 smaller islands between Mljet, Korčula and Sušac (Figure 1). The island's surface covers some 47km². Currently, about 600 people inhabit the island. Most live in Lastovo village, on the northern side of the island, or near the modern ferry harbor town of Ubli on Veljo lago, situated on the western side. Other villages with year-round inhabitants include Solitudo, Skrivena Luka, and Zaklopatica. The island has various sheltered bays and natural harbors suitable for anchorage, among them Veljo and Malo lago, Kručica, Zaklopatica, Lučica and Skrivena luka. The island has a typical Mediterranean climate, with average annual temperatures of 15 °C and annual rainfall around 700mm. The island's geology comprises a Dinaric fault within an Upper Jurassic formation, with the highest elevation situated on Hum at 415 meters above sea level (m a.s.l.). The island's karst relief is rugged, and the coastline topography is relatively steep. The best agricultural soils, as is typical on other Dalmatian islands, are primarily limited to the terra rossa *polja*. Numerous caves are known around the calcareous slopes of the *polja*, and large parts of Lastovo are still covered by natural pine and evergreen oak forest.

Lastovo is known from early 4th century BC written sources under the name of Ladesta or Ladeston. It was given the name 'Augusta insula' during Roman times by the emperor Augustus, appears as [Insula] Ladestris on the Tabula Peutingeriana, and in Medieval sources as Augusta, Lagusta or Lagosta. The Slavic form of the name – Lastobon, Lastovo – became current from the 10th century AD (see Jurica 2001; Migotti 1987; Radmilli 1970).

Although Lastovo is one of the better known Croatian islands, prior to independence from Yugoslavia in 1991, the island was not open for general tourism, and only to a limited extent for academic research. This was due to the presence of a Yugoslav naval base on the island. Prior to the 2001 season, archaeological investigations on the island were few, and there was no particular archaeological map pertaining to the island. Likewise, Lastovo is at the southern end of the Jadrolinija ferry line, and extended travel is required to reach the island. Besides distance and the previous security issues, the overall lack of field research can also be attributed to the fact that, for a brief time, Lastovo belonged to Italy, and was in general isolation in the years following the Second World War.

Investigated areas and archaeological situations

Thus far, the Augusta Insula Project investigations have been part of ongoing archaeological and interdisciplinary research in the southern Dalmatian archipelago of Korčula, Sušac, and Lastovo (e.g., Adams 1999; Bass 1997, 1998, 2004; Bass *et al.* 1997; Della Casa and Bass 2001; Radić *et al.* 1998, 2000; Radić and Bass 1999, 2001, 2002), with work on Lastovo generally conducted under the aegis of the Korčula Archaeology Research Group (KARG). The multinational team for the 2001, 2003, and 2007 field campaigns on Lastovo consisted of archaeologists and geologists from Croatia, Switzerland, the United States, and the United Kingdom. Research focused not only on field survey, test excavations, and bibliographic surveys, but also on the application of geographical information systems (GIS) and heritage management practices.

The first research season of 2001 consisted of preliminary



Figure 1. Map of the Adriatic and location of Lastovo Island.

bibliographic studies and field survey, while the 2003 season consisted of limited subsurface archaeological testing at the localities of Kaštel and Lučica. The third season, completed in 2007, focused on more intensive field survey, mapping, informant interviews, and data collection. After the 2003 season, archaeologists from the University of Zurich developed a GIS database to examine site inter-relationships, to explore their connections to the regional prehistoric and protohistoric coastal marine setting, and to facilitate a more detailed approach to mapping the island. The project is similar in scope to the Adriatic Islands Project (AIP) (see Kirigin *et al.* 2006, with further references).

Over the three seasons, the field survey focused on various *polja* (fields), *lokve* (seasonal ponds), hilltops, and the environs around the Lastovo township. The team also surveyed trails, roads, and isolated churches within the island's rugged topography. Known cave localities were also

explored. Interviews were conducted with knowledgeable residents of the island to investigate toponyms, unrecorded archaeological sites, and local anecdotal information concerning the island. During the first season, Mr Ivan Čihoratić, Head of the Administrative Department of Lastovo Municipality, and keeper of the town museum in the Knežev dvor, provided the team with former Yugoslav Army maps of the island, and indicated areas possibly containing unexploded ordnance. Mr Čihoratić also took the team to view a small archaeological exhibit in an old church below a former duke's residence. Dr Jurica, a retired local historian living in Solitudo, provided insight into areas on the island that had not been checked for archaeological remains (nearly the entire surface of the island) and discussed the island's recent history and local cultural traditions.

The field survey was conducted by walking systematic

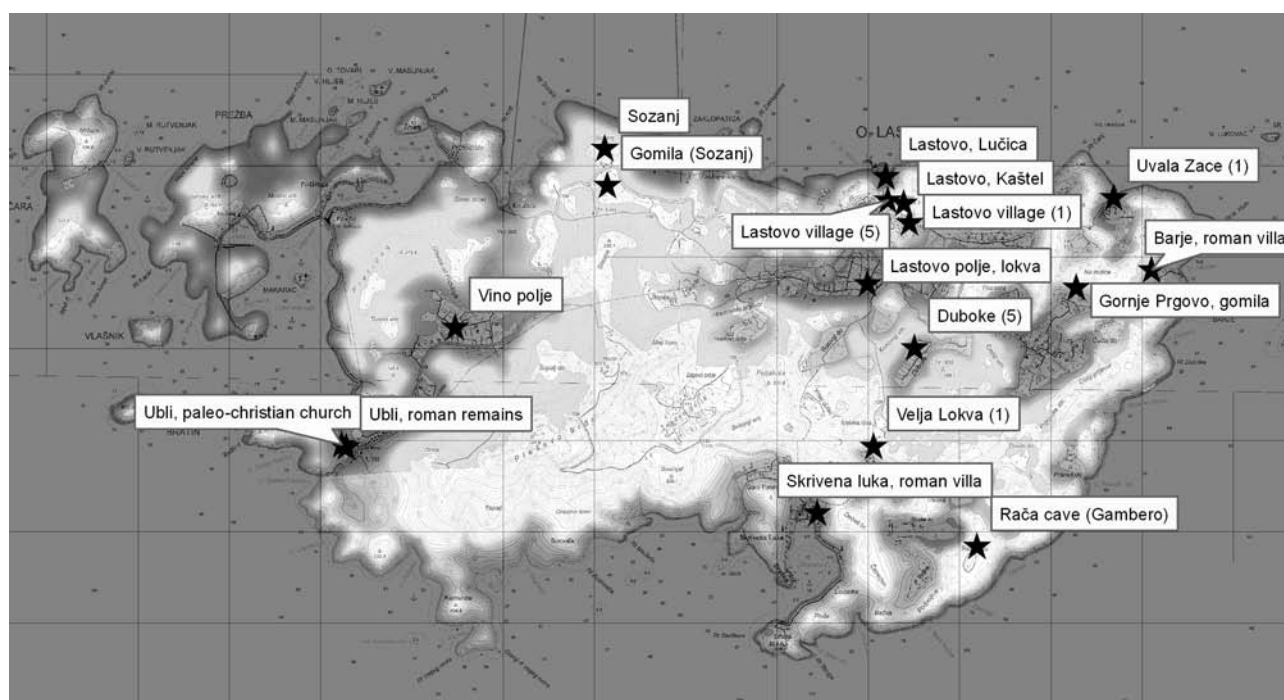


Figure 2. Map of Lastovo Island with sites discussed in the text.

transects over selected landscapes across the island. The team members walked abreast, at 10-meter intervals. As finds were encountered, the team would focus a more intensive survey in the immediate area to define the surface limits of the remains. Scatters of artifacts such as stone tools, debitage, and pottery fragments were documented as ‘sites’. Where possible, diagnostic finds were mapped, collected from the surface, and placed into labeled plastic bags. In most cases, 5mm screens were used to sieve excavated soils from the test units.

Finds were documented in the field on bi-lingual field forms (Croatian/English). The archaeological forms contain data entry fields for elements such as: type of remains, geographic setting, vegetative coverage, distance to the sea and fresh water, description of soils, exposure to winds, apparent damage to the site or remains, names of local informants, presence of diagnostic artifacts, and any associated site plans or photos.

The archaeological database was established in 2003 using Microsoft ACCESS, and run through ESRI’s ArcGIS, based on a 1:25,000 digital topographic map obtained from the Croatian State Geodetic Administration (during the first two seasons, the team relied on older 1:5000 and 1:25,000 military topographic maps). A Digital Elevation Model (DEM) with a resolution of 25 meters was obtained from GISDATA, Zagreb, and used for GIS modeling.

Previously known localities

Belamarić (1985) performed a general island survey in the

1980s and provided a very useful overview of particular zones of interest, as well as of potential sites of the prehistoric and protohistoric periods.

Pertinent investigations into Lastovo’s archaeology were conducted during the 1900s (e.g. Galli 1938), while some of the caves were visited and described (Marijanac 1956). Radmilli excavated a trench in Spilja Rača / Gambero Cave (Figure 2, 3), located in the southern part of the island, in 1942 and reported finding Neolithic, Bronze Age and Iron Age ceramic materials (Radmilli 1970). The cave was later investigated by Gjivoje (1951), and finally by Novak in 1953 who published general stratigraphic information and finds attributable to the late Neolithic (Hvar Culture), Early Bronze Age, Iron Age, Hellenistic, Roman and Medieval periods (Novak 1955; 1973). The most detailed analysis of pottery from Hellenistic times from this location was conducted by Migotti (1987).

Marconi (1936) excavated parts of the Roman settlement in Ubli early in the 20th century. Monuments of the Classical, Early Christian and Medieval periods have been extensively described by Fisković (1966). More recent excavations (1978-83) in the Roman settlement and Early Christian church of Ubli have been reported by Jeličić-Radonić (2001), and finds of coins from the 4th-9th century AD by Bonačić Mandinić (2001).

A first survey of underwater sites around the island of Lastovo (1987-90) yielded evidence of cargoes, mostly amphorae, from the 3rd century BC to the 6th century AD (Radić-Rossi 2001).



Figure 3. Topographic situation of Rača Cave (foreground), view towards southeast. Photo UZH.



Figure 4. Lučica bay viewed from the southwest. Photo UZH.

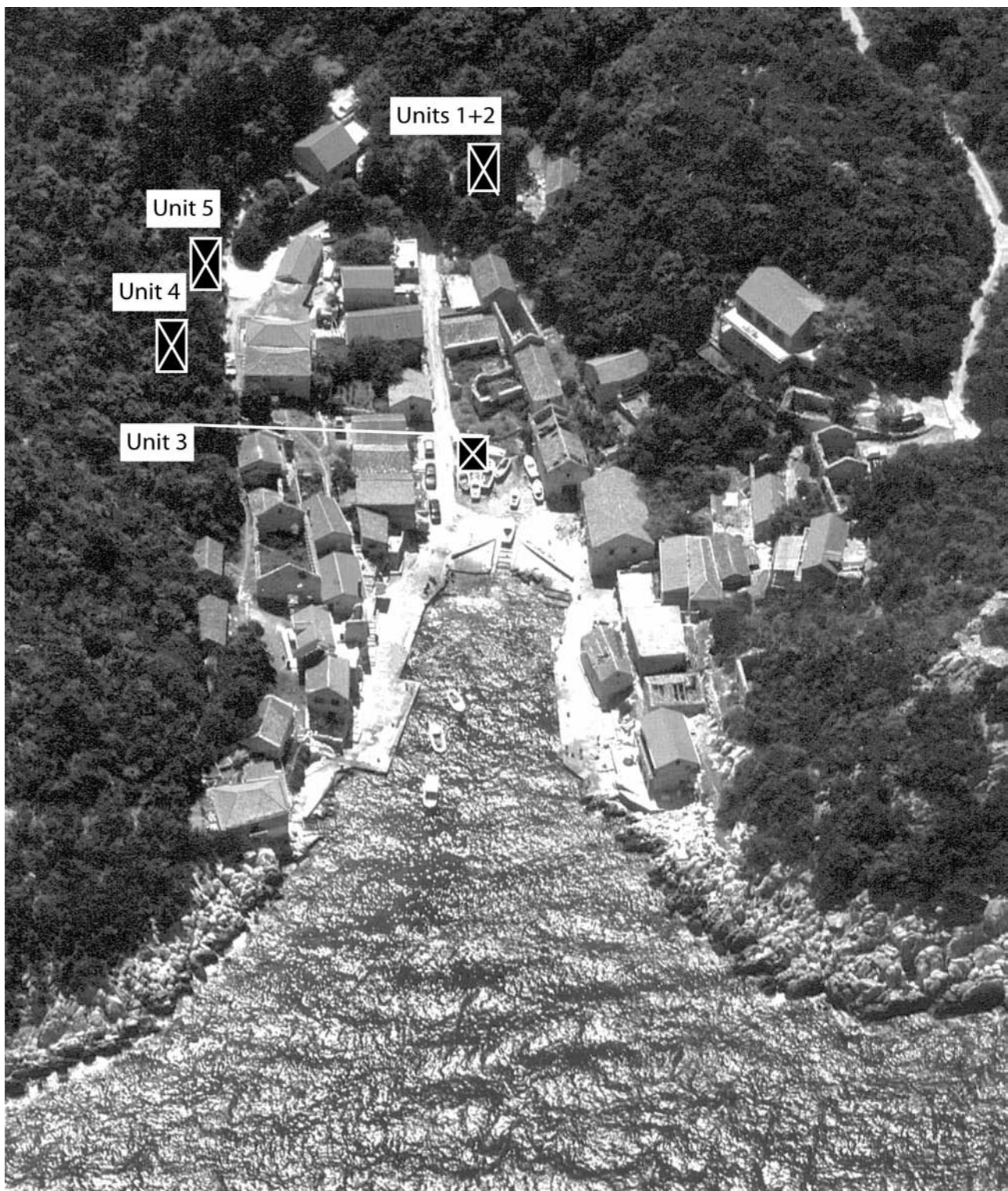


Figure 5. Aerial photo of Lučica bay with position of the 2003 test units. Photo Općina Lastovo, with additions.

Lastovo, Lučica

The small bay of Lučica lies immediately below the village of Lastovo on the northern coast of the island. It forms a small but suitable natural harbor protected from most winds, and has a pebble beach for easy landing. Lučica is the closest and most convenient access to the sea from

Lastovo village (Figure 4). In recent times, a second marine access to the west at Sveti Mihovil, comprising a concrete pier, was added for landing of ships and ferries to Lastovo. The field and olive orchard above St. Mihovil church was surveyed in 2001 and revisited in 2007, and fragments of amphorae indicate a Roman presence in this area.

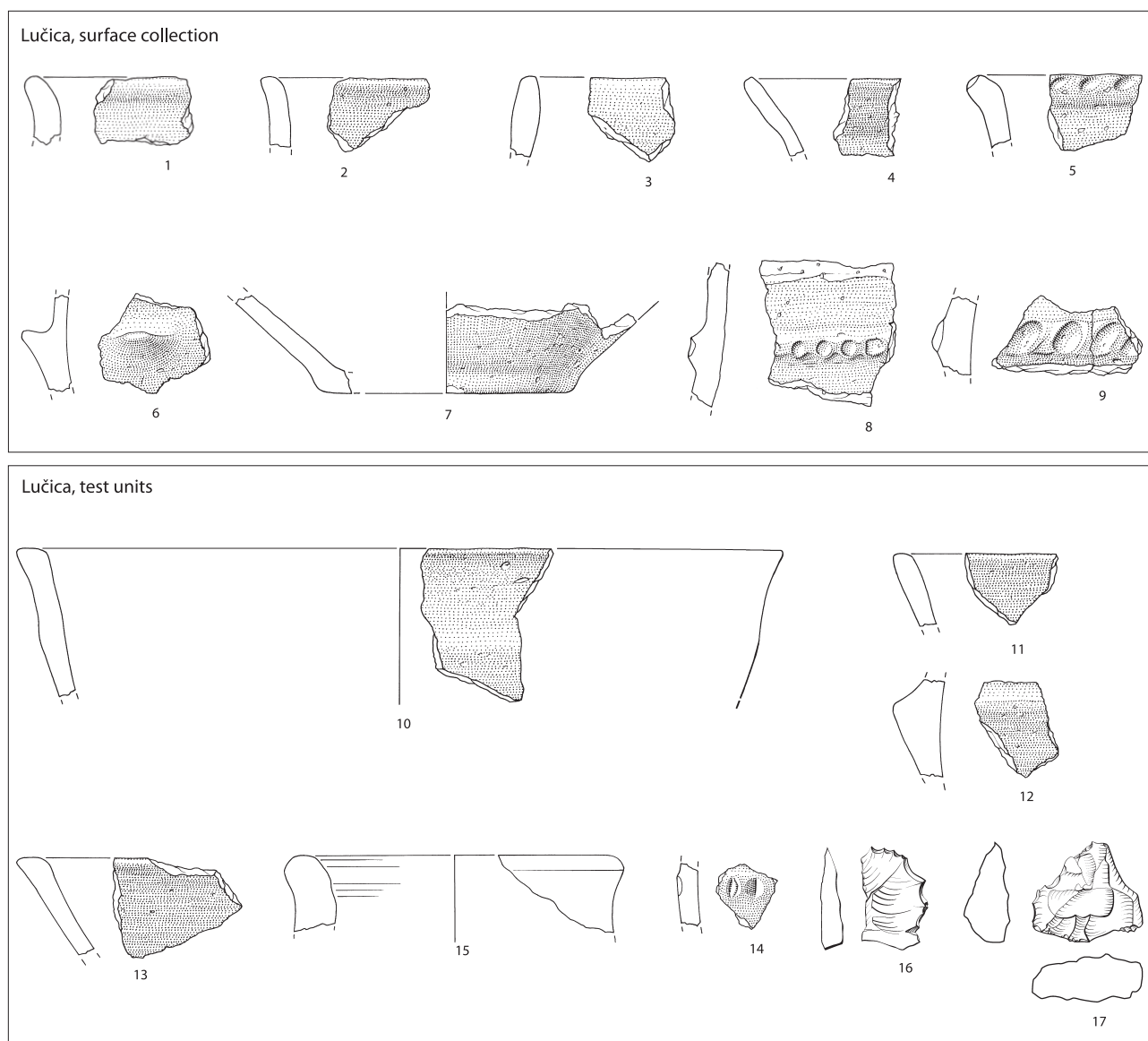


Figure 6. Pottery finds from Lastovo Lučica: 1-9 surface collection in bay area; 10-12 Unit 1 (loc. 101); 13 Unit 2 (loc. 201); 14-15 Unit 5 (loc. 502, roadcut); 16-17 Unit 3 (loc. 301, harbour). Scale: pottery 1:3, flint 1:2. Drawings by M. Reuschmann, UZH.

Lučica bay itself was surveyed in 2001 and investigated with several small test units in 2003 (Figure 5). As outlined below, none of the five tested areas of the site produced *in situ* prehistoric or later archaeological situations. However, considerable amounts of finds, in particular pottery, were recovered.

While visiting the site in 2001, the survey team had documented and collected prehistoric pottery in terraces and gardens of the southern, inland part of the bay and settlement (Figure 6: 1-9). Interviews with local inhabitants revealed that the dark humic soil of the gardens had been recently taken from the wood-covered terraces above the bay, farther to the south. Two small test units (Unit 1 and Unit 2) were opened in 2003 in the woodland just south of the modern settlement, below the modern access road, and along what is believed to be the old path leading to

the harbor. Though prehistoric pottery was present in the stratigraphy (Figure 6: 10-13), the situation proved to be completely disturbed by geomorphological processes and recent anthropogenic soil transport, with modern finds mixed into the sediments extending to the depth of sterile subsoil.

POTTERY

Most of the pottery recovered here and in the garden terraces of the settlement are of dark brown to blackish color and coarse fabric, with rough or sometimes smoothed surface. We noted the presence of straight vertical and flaring rims, flat bases, and plastic applications of lugs and notched trims (Figure 6: 1-13). There are not many well-dated, reference pottery samples in southern Dalmatia that could be used for comparison, particularly as our assemblage is

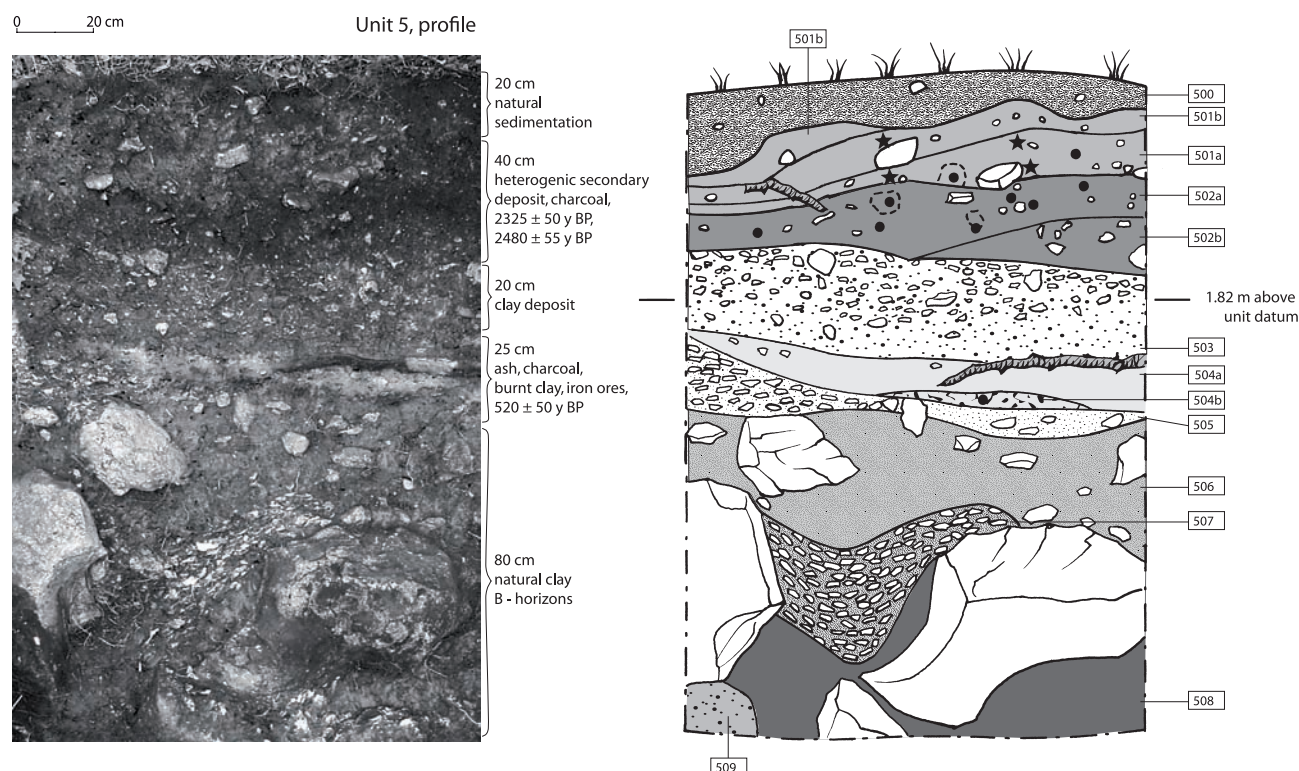


Figure 7. Lastovo Lučica, Unit 5 section and profile. Scale: 1:20. Elaboration by J. Bucher, UZH.

diagnostic. On the nearby coast of Montenegro, the Velika Gruda pottery facies is reasonably well dated to the early Late Bronze Age by radiocarbon and typological cross-comparison (Reinecke phase Bz D; Della Casa 1996, 21ss). Rim forms and plastic décor elements such as lugs and trims are present (Della Casa 1996, figure 85, 93-95), with the exception of notched trims that are known from slightly older assemblages from hillforts of the hinterland such as Varvara, Privala or Nečajno (Čović 1977, 1989; Govedarica 1982; for a revised typo-chronological positioning of these inventories see Della Casa 1996, 152ss, table 22 and the discussion below). As on Kaštel hill, some of the pottery has a characteristic whitish calcite temper (Figure 6: 13-14) known from Iron Age 'Gradina Style' pottery.

UNIT 5 PROFILE AND RADIOCARBON DATES

A dark organic layer had been identified in 2001 in a road-cut profile above the lowest bend of the modern access road to the bay. In 2003, the profile (Unit 5) was cleaned and documented in a section of c. 2 x 1m (Figure 7). It shows a rather complex sequence of gravel, loam, ash, and in the upper part, humic layers that possibly indicated an undisturbed stratigraphic situation in this part of the site. The entire profile was thus sampled and analyzed by a sedimentologist (P. Rentzel, IPSA, University of Basel), and radiocarbon dated (AMS laboratory, IMP, Federal Institute of Technology Zurich). Charcoal analysis (W. Schoch, Labor für Quartaere Hoelzer Lagnau) revealed typical Mediterranean maquis vegetation with *Juniperus*

sp., *Arbutus unedo*, *Rhamnus sp.*, *Pistacia sp.* and *Pinus sp.* (possibly *halepensis*) for loci 501-504.

The profile can be read as follows: above the bedrock, the lowest 0.8m (loci 509-505) are formed by clay B-horizons. A 0.25m anthropogenic deposit of ash, charcoal and burnt clay containing fragments of iron ore (pisoliths / limonite) tops this natural sequence (locus 504a/b). It can be dated to the period AD 1303-1453 cal. 2σ range (UZ-5171/ETH-29571 [charcoal], 520 ± 50 BP), and is indicative of the pyrotechnical working of iron ores in this area. A 0.2m secondary but mostly sterile clay deposit (locus 503) lies above the ash layer; it is topped by a sequence of c. 0.4m of heterogeneous organic-humic sediments containing calcite, charcoal, mollusks, and pottery, mostly hand-made coarse ware (loci 502-501). The prehistoric pottery (Figure 6: 14) and two radiocarbon dates of the period, 772-414 BC cal. 2σ range (UZ-5170/ETH-29570 [charcoal], 2480 ± 55 BP / loc. 502a) and 706-208 BC cal. 2σ range (UZ-5169/ETH-29569 [charcoal], 2325 ± 50 BP / loc. 501c), point to the Iron Age, while a Roman amphora fragment (Figure 6: 15) evidences later elements. In any case, the situation is disturbed and the stratigraphy inverted, with sediments having been eroded and re-deposited, most probably due to slope wash. The topmost 0.2m. (locus 500) again revealed a stable natural sedimentation in the profile.

HARBOR AREA

Two more test units were excavated on a terrace east of the bay (Unit 4, no results) and a few meters above the

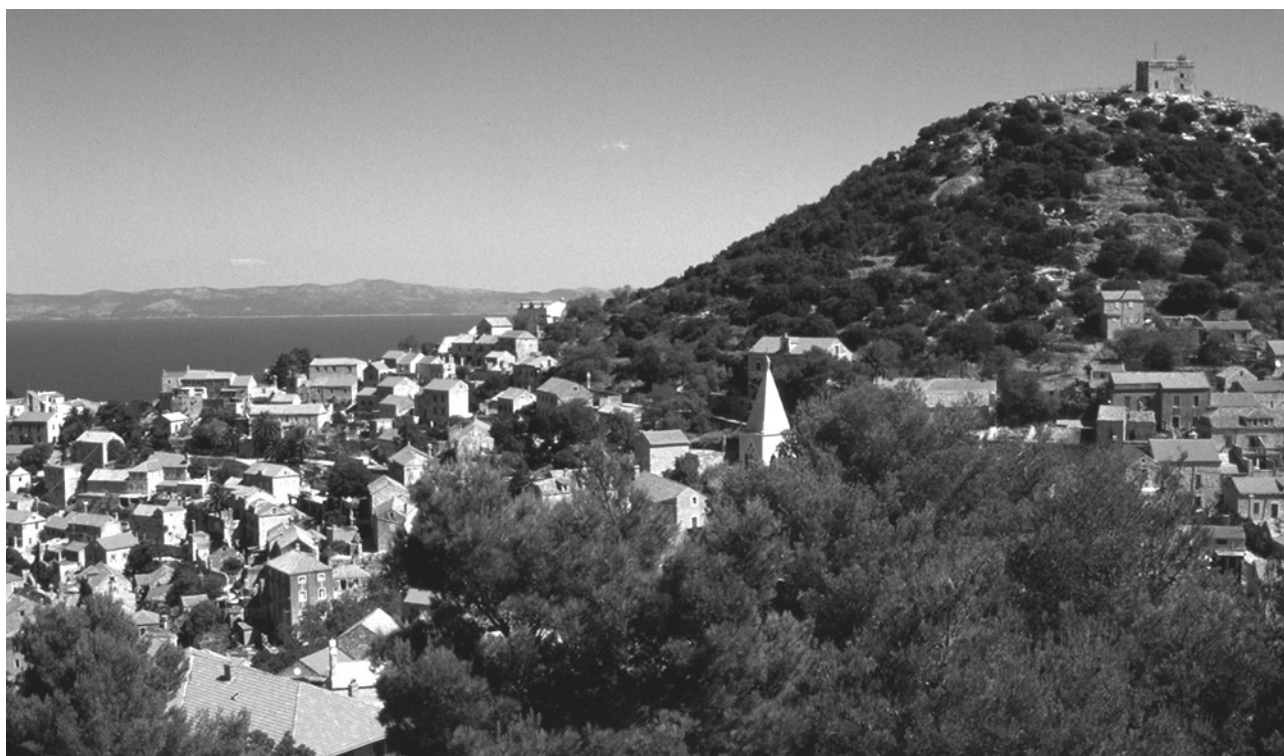


Figure 8. Lastovo Kaštel and village viewed from the southwest. Photo UZH.



Figure 9. Test unit 2 on the south slope of Kaštel overlooking Lastovo village. Photo UZH.

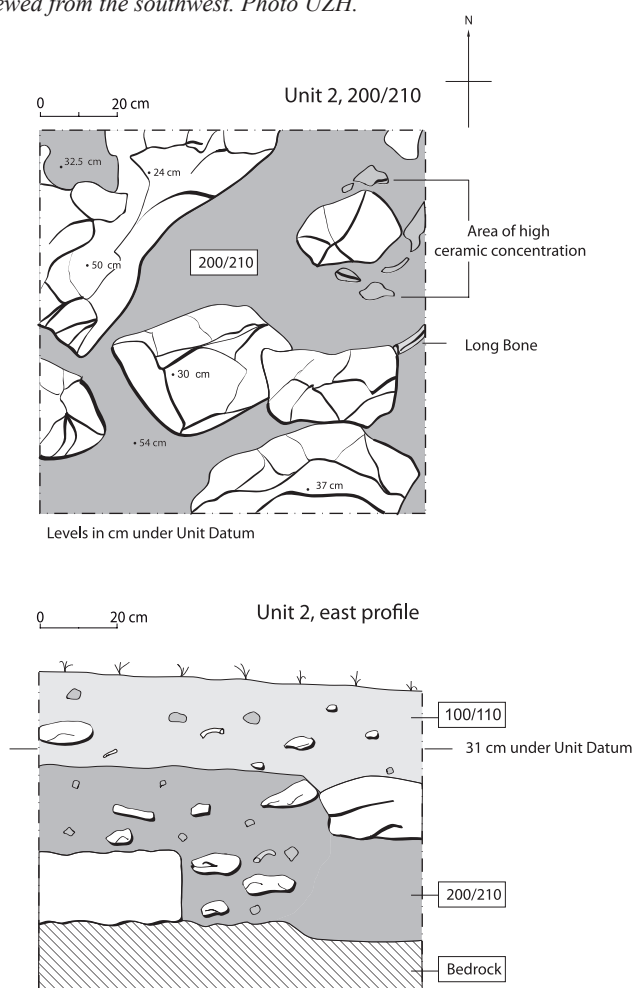


Figure 10. Lastovo Kaštel, Unit 2 (2003), plan and section. Scale 1:20. Elaboration by J. Bucher, UZH.

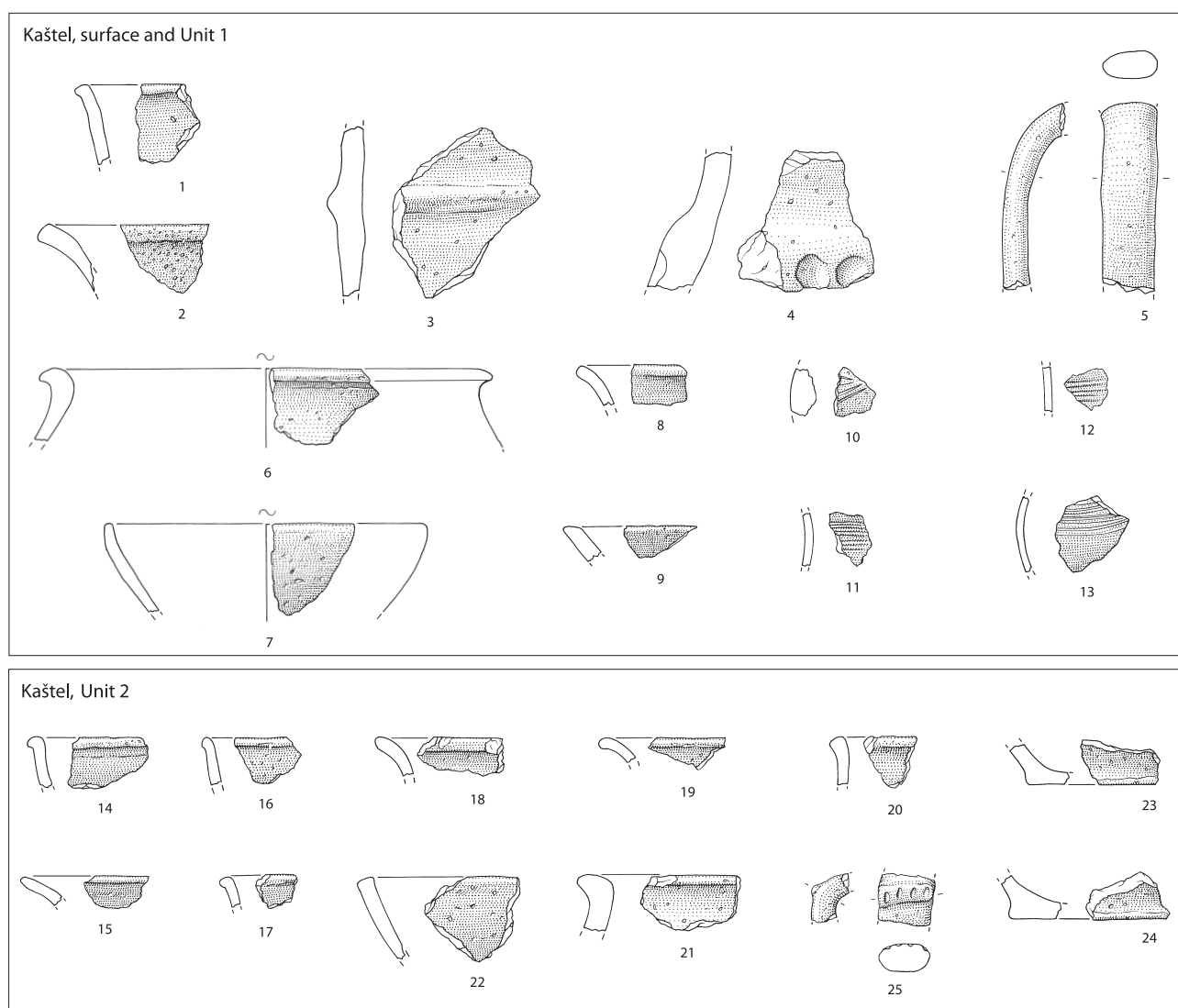


Figure 11. Prehistoric pottery from Lastovo Kaštel: 1-5 surface collection south slope; 6-13 Unit 1 (pumphouse); 14-15 Unit 2 (loc. 100/110), 16-25 (loc. 200/210). Scale: 1:3. Drawings by M. Reuschmann, UZH.

shoreline, in the back part of the pebble beach (Unit 3) – situated in what is presently (2007) a concrete car parking. It was hoped that an archaeological situation pertaining to the initial use of the beach and bay might be uncovered here. Again, the stratigraphy, comprised of an intermittent sequence of sands and gravels, revealed disturbances almost to the depth of the underground water table at c. 1.5m. Prehistoric pottery was scarce in this area, but the strata contained a significant amount of charcoal and, in the lower parts, several flint flakes, some retouched (Figure 6: 16-17). Though not diagnostic in chronological terms, these flints could indicate an early, possibly Neolithic, use of Lučica bay.

To summarize, the archaeological investigation of Lučica bay has proved difficult due to an overall unstable geomorphological situation, coupled with considerable anthropogenic impact on the adjacent slopes and terraces. Occupation as early as the Neolithic is possible, but is

certain for the later parts of the Bronze Age, the Iron Age, and the Roman period. There is evidence for the working of iron (ores) in the 14th/15th century AD, along with the implied general use of the naturally protected harbor.

Lastovo, Kaštel

The hilltop Kaštel, situated at 188m a.s.l., rises above Lastovo village and overlooks the fields to the south and the adjacent coast and islands to the north (see Figure 2). Surface collection during the first season from the environs of Kaštel revealed prehistoric and Greco-Roman pottery fragments. During the second season, two test units were excavated at Kaštel, just below the weather station (Figure 8). Unit 1 yielded a significant quantity of materials from the prehistoric through Roman periods, but the materials comprised a secondary deposit that terminated atop a subterranean electrical substation.

Unit 2, located on a terrace below and to the south of the weather station, revealed artifacts in a secondary deposit originating from higher up the slope (Figures 9 and 10). The test unit measured a mere 1 x 1m, and terminated 60 centimeters below surface at limestone bedrock. The small test unit yielded a large quantity of materials, including: mammal bone, shell, prehistoric pottery, Greco-Roman fine and coarse ware fragments, rounded beach pebbles, a fibula, bronze pins, bronze and iron metal fragments, two coins, one pearl, slag, and glass. No radiometric dates were obtained from this test unit, as the materials were all derived from a non-secure secondary deposit.

PREHISTORIC POTTERY

The prehistoric pottery recovered from the surface and the two test locations on Kaštel (Figure 11) generally derives from Bronze Age and Iron Age activities around the hilltop. None of it is stratified (see above), and there are only few diagnostic elements. As in Lučica and on Sozanj hill, flaring rims, flat bases, strap handles and plastic decorations (Figure 11: 1-5, 14-17, 23-25) can be attributed to the Bronze Age. Small fragments of pottery with grooved and incised decoration (Figure 11: 10-13) might be of Middle and early Late Bronze Age date. Fragments of open spherical bowls and profiled rims (Figure 11: 6-7, 21-22) are shapes of the earlier 1st millennium BC (Late Bronze Age and Iron Age) that go along with a few metal finds of the same period (see below and Figure 13: 5). So far, no clearly Neolithic or Copper Age material can be positively identified.

GREEK AND ROMAN POTTERY

Considerable amounts of Greek (Hellenistic) and Roman pottery come from surface collection and test unit 1 (unstratified) near the pump house, and from test unit 2 (re-deposited, see above) on the south slope of Kaštel hill (Figure 12). The results are tabulated in a preliminary form according to diagnostic elements by number and weight (Table 1).

From the area of Unit 1 we note, in particular, amphorae of Greco-Italic type (Figure 12: 2, 5), Corinthian B (Figure 12: 6), Lamboglia 2, as well as possible body fragments of a Late Roman amphora, and a single fragment of Dressel 2-4 type (Figure 12: 11). No tiles were found in this zone.

As in Unit 1, the major part of the pottery from Unit 2 (Table 2) belongs to common ware, mostly of reddish clay without smoothing or painting. A few sherds are from Issaeian jugs (Figure 12: 12-13) and cooking pots (Figure 12: 17). The Greek fine ware is mostly early to late Hellenistic, with some sherds of plain ware. We note Issaeian production, black gloss fragments, a few Gnathia fragments, and grey ware (Figure 12: 15-16), but no relief pottery (however, one sherd from Joško Jurić collection – see below). Roman fine ware is thin-walled (Figure 12: 19-20), mostly without decoration, and there are a few Arretine sigillata body sherds.

The Kaštel assemblage is completed by the private collection of Joško Jurić (probably a surface collection),

Table 1. Overview of pottery from Kaštel Unit 1. G/R = Greek or Roman; CW = Common Ware; Amph. = Amphorae. Analyzed by B. Kirigin, Archaeological Museum Split.

Unit 1	Greek	Roman	G/R	CW	Amph.	Pithoi	Other	Total
Surface	13 / 40g	2 / 40g	3 / 10g	21 / 185g	17 / 1175g	2 / 1575g	1 / 5g beehive	59 / 3030g
Upper loci	17 / 39g	10 / 21g	6 / 10g	71 / 215g	30 / 610g	-	5 / 15g modern	139 / 910g
Lower loci	6 / 17g	3 / 3g	4 / 5g	13 / 50g	1 / 100g	-	-	27 / 175g
Total	36 / 96g	15 / 64g	13 / 25g	105 / 450g	48 / 1885g	2 / 1575g	6 / 20g	225 / 4115g

Table 2. Overview of pottery from Kaštel Unit 2. G/R = Greek or Roman; CW = Common Ware; Amph. = Amphorae. Analyzed by B. Kirigin, Archaeological Museum Split.

Unit 2	Greek	Roman	G/R	CW	Amph.	Tile	Misc.	Total
Locus 100/110	49 / 89g	117 / 134g	212 / 213g	462 / 1171g	74 / 1310g	21 / 745g	377 / 482g	1312 / 4144g
Locus 200/210	125 / 266g	136 / 122g	264 / 325g	618 / 1664g	232 / 6200g	28 / 503g	608 / 760g	2011 / 9840g
Total	174 / 355g	253 / 256g	476 / 538g	1080 / 2835g	306 / 7510g	49 / 1248g	985 / 1242g	3323 / 13984g

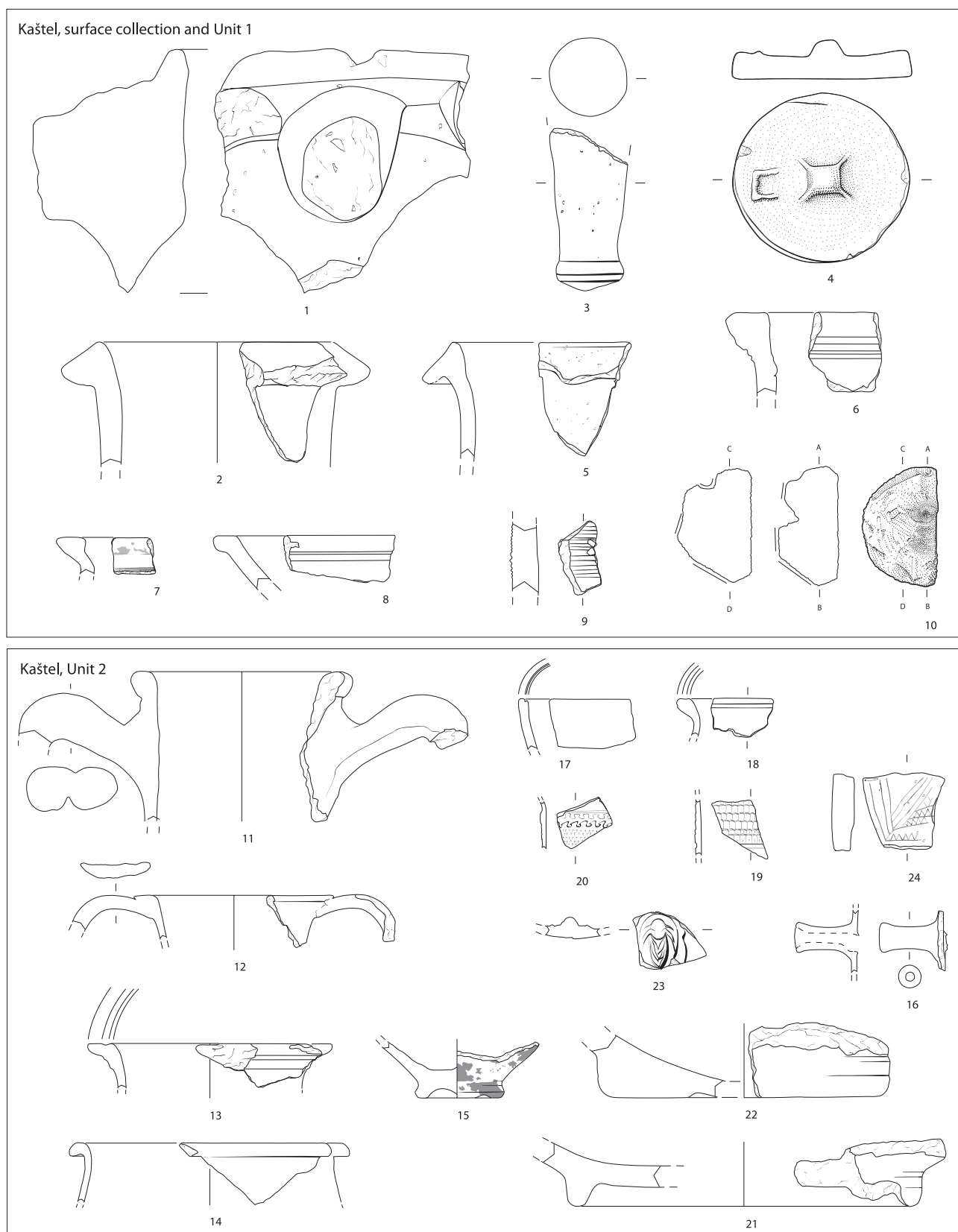


Figure 12. Greek and Roman pottery and small finds from Lastovo Kaštel: 1-10 surface collection and Unit 1 (pump house) – 1 pithos; 2-6 amphorae; 7-8 fine ware; 9 beehive; 10 worked stone. 11-24 Unit 2 (various loci) – 11 amphora; 12-14 jugs; 15-16 gray ware; 17-18 cooking pots; 19-20 Roman fine ware; 21-22 coarse ware; 23 lamp sherd with bug relief; 24 clay plaque with incised decoration. Scale: pottery 1:3, small finds 1:2. Drawings by J. Bucher, UZH.

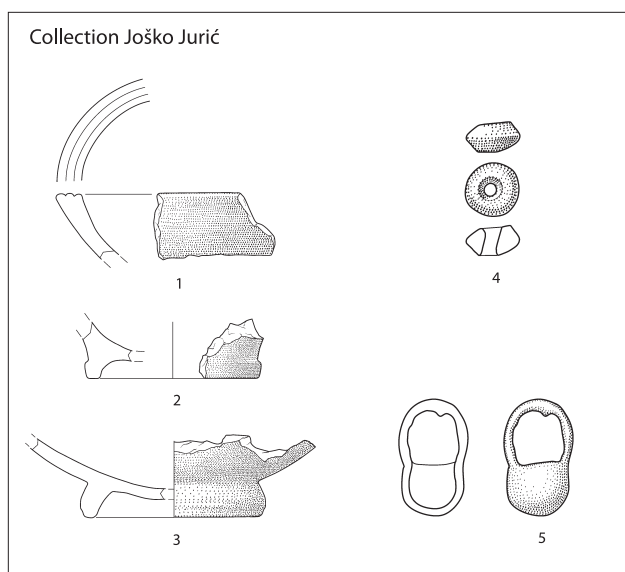


Figure 13. Collection Joško Jurić (selection). 1, 3 Hellenistic gray ware; 2 Attic black gloss; 4 green pearl; 5 bronze pendant. Scale: pottery 1:3, small finds 1:2. Drawings by J. Bucher, UZH.

donated to the Archaeological Museum in Split in 1995 and 1998 (Figures 13 and 14). The collection comprises three lead slingshots of 40g, 70g, and 75g, one basket-shaped bronze pendant (7th-6th century BC, Figure 13: 5) and one biconical green pearl (Figure 13: 4). The pottery includes 17 fragments of grey ware with fine to medium black gloss (some of them skyphoi and plates) (Figure 13: 1-3), one fragment of a grey relief bowl with rosette and floral decoration (Figure 14: 18), 12 black gloss sherds with geometric and floral decorations (all too small for proper identification), two graffito letters 'M' (Figure 14: 5, 8), two kylix bases, one skyphos base, one Attic ribbed skyphos, six different handles, and one early Christian lamp sherd (Figure 15: 1); a similar piece has been published from Ubli: Jeličić-Radonić 2001, Figure 12). Interesting are a few late Archaic sherds (Figure 14: 2-3, 6, 13) that all seem to be of Attic fabric, similar to finds from the nearby islands of Hvar, Vis and Brač.

The Greco-Roman material from units 1 and 2 can be roughly dated to the period between the late 4th century BC and early 1st century AD. It appears that the site occupation stops in the same period as in Rača Cave (Migotti 1987),

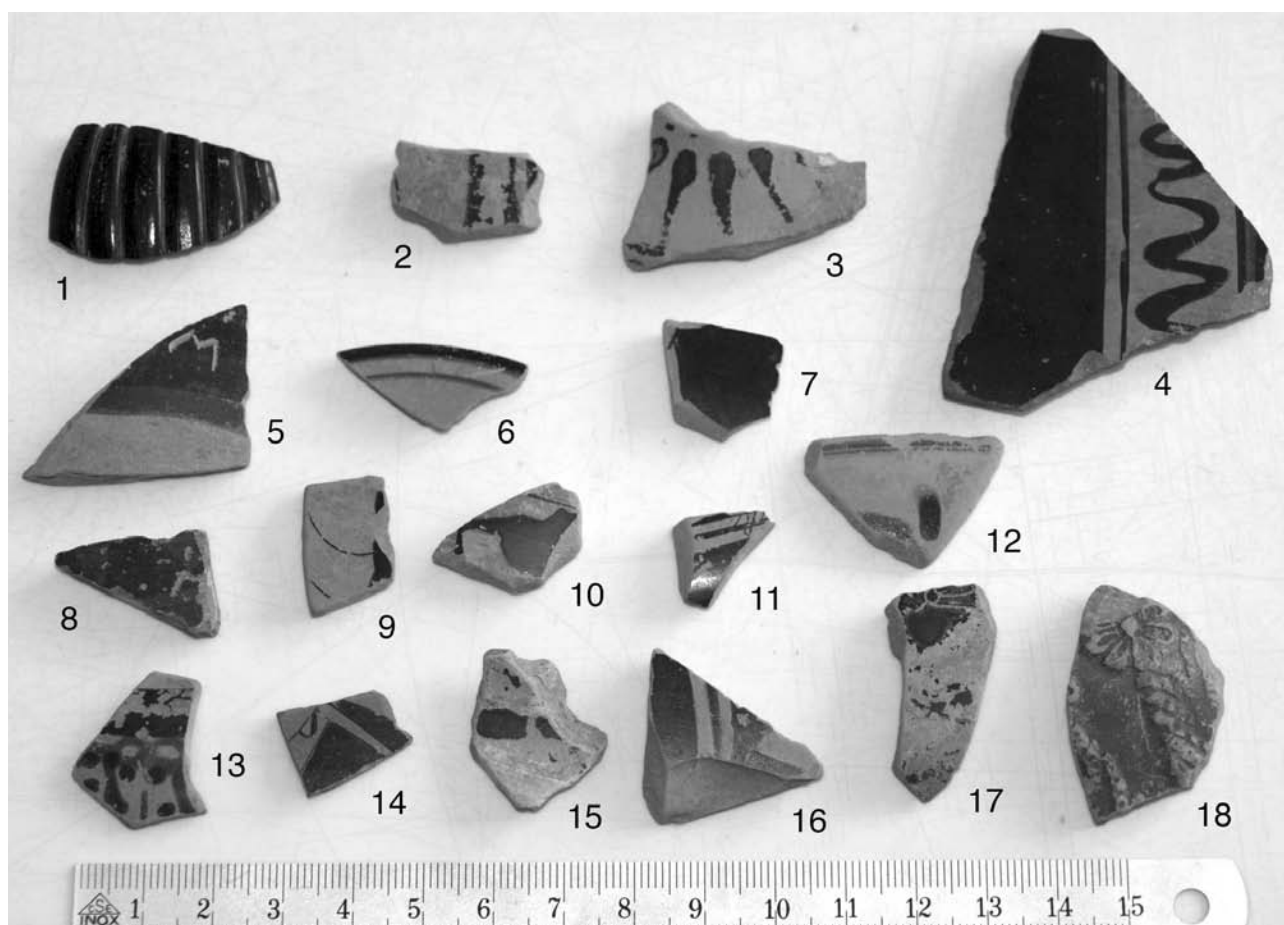


Figure 14. Collection Joško Jurić: black gloss pottery. 2-3, 6, 12-13, 17 Attic, late Archaic; 1, 7, 9-11, 14, 16 Attic, Classical; 4-5, 8 South Italian; 18 Hellenistic relief decorated bowl. Photo UZH.



Figure 15. Coins and small finds and from Kaštel units 1 and 2. Photo Museum Split.

the sanctuary site of Spila Cave at Nakovana and the nearby hillfort Grad (Forenbaher and Kaiser 2003), and at the shrines of Diomedes on Palagruža (Kirigin and Čače 1998) and at Cape Ploča (Bilić-Dujmučić 2004; Kirigin 2004). However, common ware is much more represented on Kaštel, indicating a settlement site. Although the sherds are small and weathered, especially among the fine wares, the assemblage does not seem to be different from other sites with Greek and Hellenistic pottery in the region.

So far, only two fragments of pottery can be attributed to the Late Roman period (one amphora from Unit 1, and one early Christian lamp from the Jurić collection). From the survey in the village area, there is also a fragment of a decorated basin, probably of Greek/Hellenistic date (see Figure 20: 2). Altogether, evidence for a settlement between the 2nd and 5th/6th centuries AD (or later Byzantine period) is very scant for the time being.

COINS AND SMALL FINDS

In the secondary deposit of Unit 1, we found fragments of a bronze chain (Figure 15: 2), one iron nail and unidentified iron fragments, small fragments of green, blue, brown, and transparent roman glass, as well as one fragment of a ribbed brown bowl or cup produced in an Italian or Eastern Mediterranean workshops between the second half of the

1st century BC and the 1st century AD (Buljević 2004, 187).

In Unit 2, besides finds of uncertain date such as fragments of bronze and iron, iron nails, lead slag, a possible lead seal and a ribbed iron plate (Figure 15: 4), the most diagnostic Greek and Roman metal finds are: three fragments of bronze pins, fragments of bronze wire (Figure 15: 2), one bronze nail with marks on the reverse (Figure 15: 3), and one possibly Greek bronze coin. Of particular interest is a bronze coin struck in Corinth in the year 44 or 43 BC: duoviri L Aeficius Certus and C Iulius Iiviri; OBV: LAVS IVLI CORINT, laureatus head of Caesar to the right; RV: (L) CERTO ÆFICIO (C IVLI[O]) IIVIR, Bellerophon wearing petasus, mounted on Pegasus flying to the right and striking downwards with spear (Burnett *et al.* 1992, RPC I, 1116 Corinth), so far the unique coin of this type evidenced in the Eastern Adriatic (Figure 15: 5-6), and a bronze fibula type Almgren 65, produced in northern Italy from the second quarter of the 1st century BC until early Augustean times (ca. 35/30-15/10 BC; Figure 15: 7) (Boura *et al.* 1990; Demetz 2008). There are many examples of this type of fibula on the Eastern Adriatic coast (Lokošek 1990, 98-99). It came to the Eastern Adriatic from the north during Romanization and is often found together with Lamboglia 2 amphorae (Ivčević 2002, 333-334). The piece from Lastovo is the southernmost fibula of this type evidenced in the Eastern Adriatic. We also note a small green glass

pearl, and a fragment of a green glass cup with discoid foot produced in workshops of the Eastern Mediterranean in the Late Roman period (Roffia 1993, 90) (Figure 15: 8). These finds and other diagnostic elements among the pottery indicate that Lastovo was an important maritime base at the time of Romanization in the Eastern Adriatic.

ANIMAL BONES

The results of the determination of animal bones and shells are given in Tables 3–7. Despite the small areas of excavation, the bone and shell samples are quite large. The conservation conditions seem to be good for a terrestrial

site in Mediterranean climate. *Ovis* and *Capra* outnumber all other species by far. They probably also account for most of the ‘Small Mammals’ group, although they may be concealing an unknown number of *Sus* sp. The degree of bone fragmentation is relatively high, and only rare pieces are larger than 5 cm. There are plenty of cut marks, especially on rib bones.

The determination of bones and mollusks took place in the field by Emanuela Jochum. Without a comparative collection, the samples had to be identified with the help of private notes, and with reference to Milišić (1991) and Schmid (1972).

Table 3. Summary of bone and shell samples from Kaštel, Units 1 and 2.

Locus	Unit 1, Pump House	Unit 2, South Slope		
	All loci (Total)	Locus 100/110	Locus 200/210	Total
Vertebrata	127	100	505	605
Indet. Vertebrata	8	437	2178	2615
Mollusca	189	123	202	325

Table 4. Overview of identified vertebrate bone samples, Lastovo Kaštel, Unit 1. The groups of large and small mammals consist of specimens that cannot be classified beyond the class Mammalia. Large mammals may include Bos, Cervidae and Equidae. Small mammals may include Capra, Ovis, Capreolus, Sus, Rodentia and Carnivora. Determination by E. Jochum, UZH.

Unit 1	Ovis/Capra	Ovis aries	Capra hircus	Bos taurus	Sus sp.	Cervus sp.	Lepus/Oryctolagus	Large mammals	Small mammals	Fish	Aves	Indeterminate	Calcinated bones, indeterminate
Upper loci	26	1	2	-	1	-	-	2	65	8	4	4	4
Lower loci	8	-	1	-	-	-	-	-	8	1	-	-	-
Total	34	1	3	-	1	-	-	2	73	9	4	4	4

Table 5. Overview of identified vertebrate bone samples, Lastovo Kaštel, Unit 2. The groups of large and small mammals consist of specimens that cannot be classified beyond the class Mammalia. Large mammals may include Bos, Cervidae and Equidae. Small mammals may include Capra, Ovis, Capreolus, Sus, Rodentia and Carnivora. Determination by E. Jochum, UZH.

Unit 2	Ovis/Capra	Ovis aries	Capra hircus	Bos taurus	Sus sp.	Cervus sp.	Lepus/Oryctolagus	Large mammals	Small mammals	Fish	Aves	Indeterminate	Calcinated bones, indeterminate
Locus 100/110	23	2	1	-	8	2	9	10	39	6	-	319	10
Locus 200/210	110	12	16	9	6	1	7	54	270	15	5	2178	90
Total	133	14	17	9	14	3	16	64	309	21	5	2497	100

Table 6. Overview of identified shell samples, Lastovo Kaštel, Unit 1. Determination by E. Jochum, UZH.

Unit 1	Patella sp.	Monodonta	Clausilidae	Cerithium sp.	Pomatidae	Helicidae	Loripes lucinalis	Molluscae indeterminate
Upper loci	48	54	5	2	18	11	1	-
Lower loci	15	20	-	3	1	1	-	1
Total	63	74	5	5	19	12	1	1

Table 7. Overview of identified shell samples, Lastovo Kaštel, Unit 2. Determination by E. Jochum, UZH.

Unit 2	Patella sp.	Monodonta	Clausilidae	Cerithium sp.	Pomatidae	Helicidae	Murex sp.	Myrtea spinifera	Molluscae indeterminate
Locus 100/110	46	58	-	3	6	-	2	1	7
Locus 200/210	69	75	1	6	33	10	-	1	7
Total	115	133	1	9	39	10	2	2	14



Figure 16. Panoramic view from Sozanj hilltop, to the east: Zaklopatica bay, Lastovo Kaštel (right); to the west: Kručica bay, Malo lago bay (left). Photo: UZH.

Sozanj

Sozanj comprises a dramatic promontory on the north coast of the island, some 3.5km west of Lastovo Kaštel (Figure 16). The position dominates the entire northern coastline, from Prežba peninsula and Malo lago bay to the west, to Zaklopatica bay, Lastovo Kaštel and Novi hum on the far northeast of the island. The location had been indicated as a potential site by local informants. A first visit to the hill in 2003 revealed a massively terraced, southeast oriented slope, and a superb naturally defended hilltop with

a large surface scatter of prehistoric pottery, in particular on the upper terraces of the site. While the hill is extremely exposed towards the sea, the entire southeast segment of the slope is naturally terraced, with dry-stone walls added to form settlement terraces. The upper part – the actual hilltop – is separated by a steep band of cliffs, with only one narrow passage giving access to the uppermost, well-defended, small terraces of the site. A massive stone *gomila* (see Figure 2) was also detected on the hill just opposite Sozanj, to the south, which might originally be connected to the Sozanj site. There is fairly easy access to the sea,



Figure 17. Sozanj, Unit 3 (2007), upper terrace to the west of the hilltop. Photo UZH.



Figure 18. Pottery, flint and bone from Sozanj, Unit 3. Photo UZH.

via Kručica bay, about 1.5km to the southwest. This bay area was surveyed in 2007 with no tangible results for prehistoric periods.

TEST UNITS

The 2007 investigations on the Sozanj hilltop consisted of an extended survey of the accessible terraces, identification of possibly anthropogenic structures, collection of surface finds, and sub-surface testing in four small trenches, two of which (Units 1 and 3) yielded archaeological stratigraphy (Figure 17). Test Unit 1 (0.5 x 0.5m) was placed on the summit of the hill (232m a.s.l.) in a pocket of clay/humus sediment. There was no visible stratification in the four arbitrary strata that were excavated. The trench reached a depth of 0.35m, with the lower loci (120, 130, 140) containing a considerable amount of coarse and fine prehistoric pottery, a fragment of a whorl (Figure 19: 1-6), a fragment of a polished stone tool, flint flakes, burnt clay from a hearth, charcoal, and animal bones (small ruminants,

one carnivore molar). Test Unit 3 (0.5 x 0.5m, 227m a.s.l.) was set on one of the higher terraces to the west of the hilltop (Figure 18). The sediment here was stratified, with humic layers down to 0.25m (loci 310 and 320), and a clay stratum (locus 330) containing burnt material, charcoal, bone, and pottery down to 0.35m. Fine and coarse ware fragments were recovered, along with a rectangular retouched flint blade fragment, a small perforated bone object (Figure 19: 7-14), as well as small ruminant and carnivore teeth and bones.

RADIOCARBON DATES AND FINDS

Two radiocarbon dates give highly coherent results for the lower levels in both of these test units, with a Late Bronze Age span of 1290-931 BC cal. 2σ range (ETH-34458 [charcoal], 2910 ± 55 BP / loc. 140) and 1260-928 BC cal. 2σ range (ETH-34457 [animal bone, UF], 2895 ± 55 BP / loc. 320). The pottery, dark fired with organic temper and frequently burnished or slipped, shows diagnostic elements

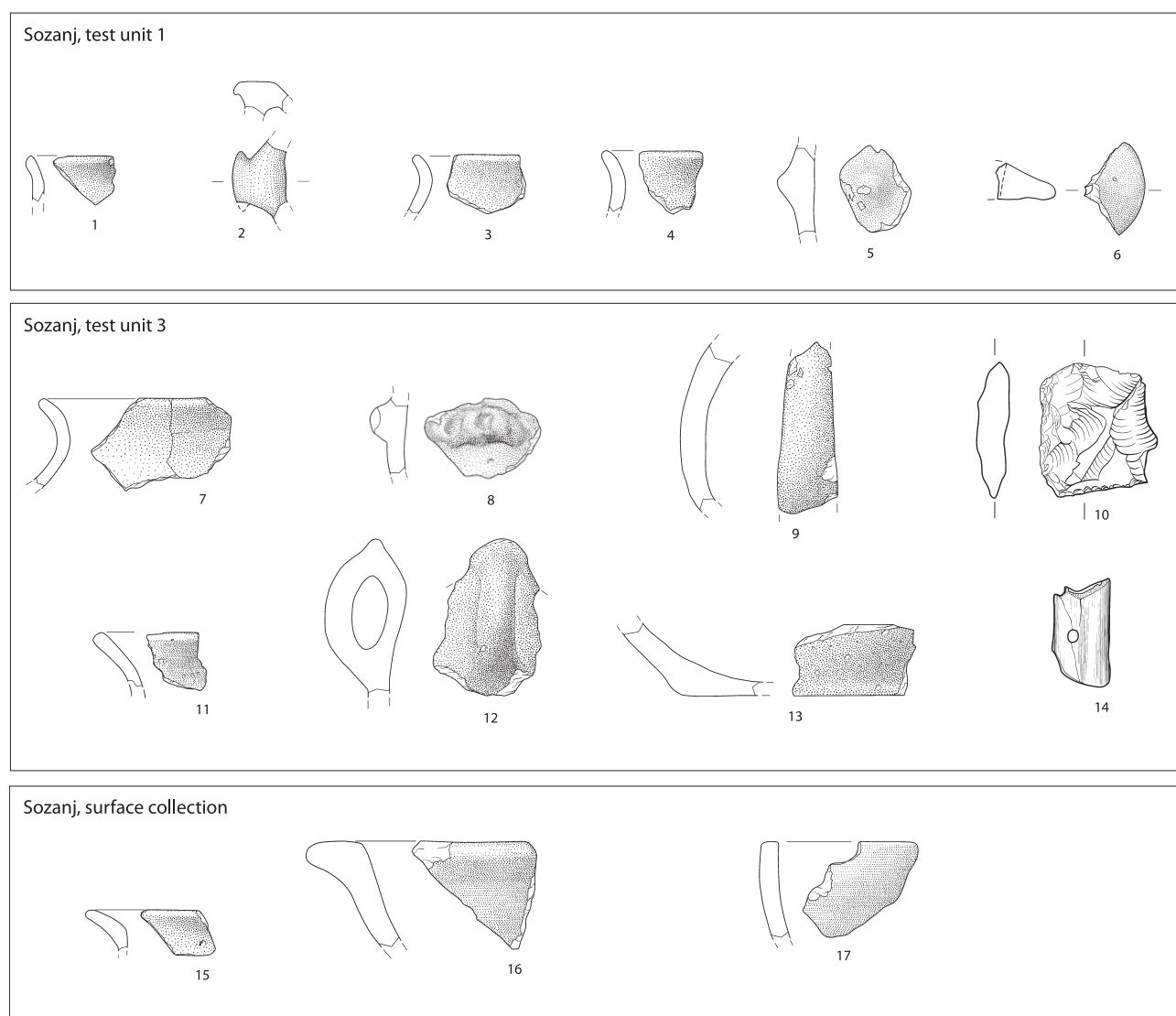


Figure 19. Pottery and small finds from Sozanj: 1-2 Unit 1 (loc. 130), 3-6 (loc. 140); 7-10 Unit 3 (loc. 320), 11-14 (loc. 330 – 14 bone); 15-17 surface collection. Scale: pottery 1:3, small finds 1:2. Drawings: J. Bucher; UZH.

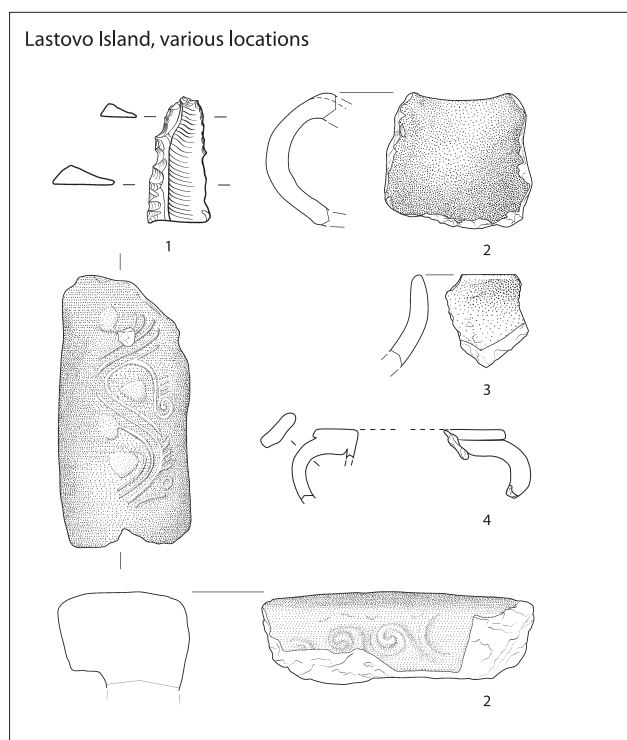


Figure 20. Lastovo Island, finds from various locations: 1 flint, Duboke 5; 2 pottery, Kruševa njiva; 3 pottery, Uvala Zace; 4 pottery, Skrivena luka (Roman villa); 5 pithos fragment, Lastovo village 5. Scale: pottery 1:3, flint 1:2. Drawings by J. Bucher, UZH.

such as flaring rims, plastic applications, notched lugs, and vertical strap handles. Particularly characteristic is a handle of a carinated bowl or pot with raised rim (Figure 19: 12). This pottery shape is well known from Bronze Age hillforts of the Dalmatian hinterland and Dinaric interior (see above, Lučica), e.g. from Nečajno and Sovići (Čović 1989, pl. 2-3),

and the levels A3-B2 in Varvara (Čović 1977, pl. 28: 1). According to our revised chronology (Della Casa 1996, table 22), these levels cover the period 1500-1200 BC. The Sozanj radiocarbon dates now confirm this chronological positioning in absolute terms.

Among the many sherds collected from the surface of the site, we noticed a group of coarse ware vessels with a white calcite temper, some with reddish slip, displaying everted and vertical rims (Figure 19: 15-17), and flat or horizontal lug handles. Again, these are reminiscent of 'Gradina' type pottery (Lučica and Kaštel, above). This pottery evidences a later use of the hilltop during the Iron Age, though in the areas tested in the upper part of the site, this period is not stratigraphically represented. The settlement seems to stop around the mid-1st millennium BC, possibly about the period when Greek pottery starts to be well attested on Kaštel (see above).

Preliminary GIS-based analysis of settlement topography

The find localities recorded so far can be subdivided into three distinct groups (see Figure 2):

1. sites with identifiable structural and material remains, such as the localities Kaštel, Sozanj, Lučica and Rača Cave, as well as mural remains and a few finds from a Roman villa at Skrivena luka (Figure 20: 4), and the Roman-Early Medieval remains in Ubli. These sites seem to be indicative of general settlement-related activity, with the exception of Rača Cave, located away from resources in the southeast of the island (see Figure 3), and for which a ritual (social/cultic) interpretation seems most likely.



Figure 21. Flint blades from Vino polje (private collection). Photo UZH.

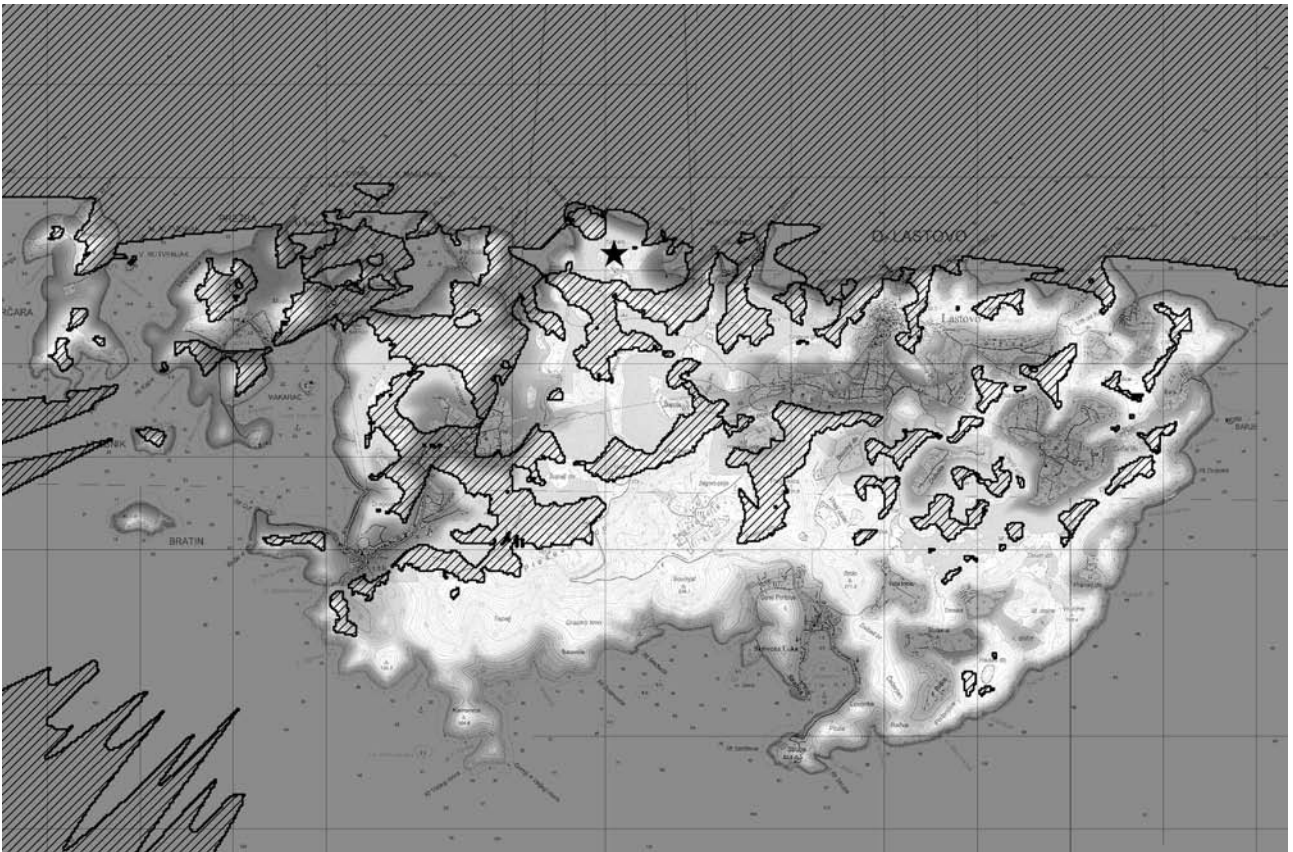


Figure 22. Viewshed analysis using Sozanj hilltop as center. Elaboration by M. Sauerbier, ETHZ.

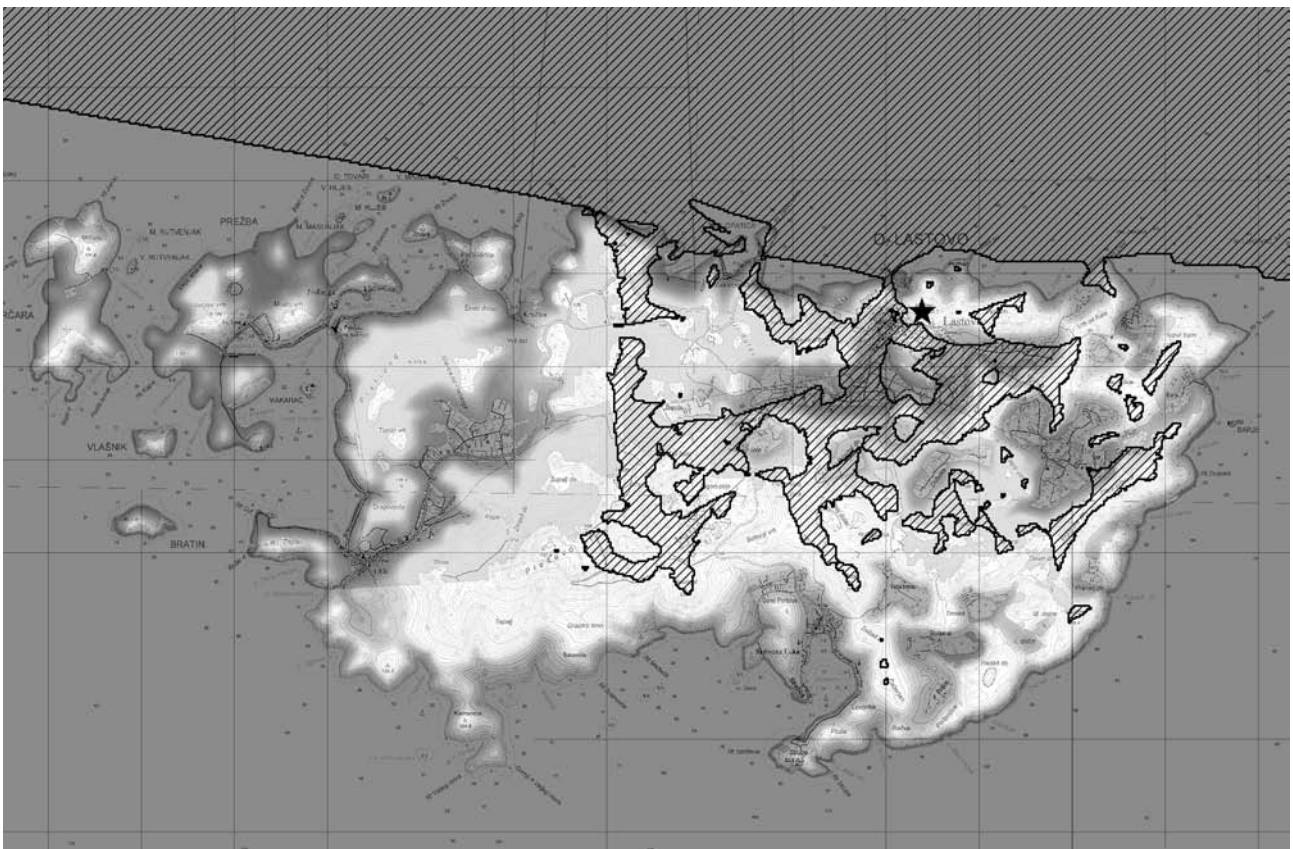


Figure 23. Viewshed analysis using Kaštel hilltop as center. Elaboration by M. Sauerbier, ETHZ.

2. There is prehistoric material known from localities such as Kruševa njiva (Figure 20: 2) and VINO polje (Figure 21, from a private collection) that indicate Neolithic to Bronze Age sites of, as yet, unknown nature. Roman tegulae from Kruševa njiva, Uvala Zace and Barje are most probably indicators of Roman villas in these fertile patches of land. Other sites have yielded structural remains such as walls or cairns, but have not been dated thus far. These include various *kule* (towers) or ‘huts’ (e.g. at Velja lokva), and the *gomile* near Sozanj and in Gornje Prgovo, as well as the *lokva* (seasonal pond) in Lastovo polje that is still supported by a Roman wall.
3. Finally, there are considerable amounts of prehistoric and early historic stray finds from nearly all the *polja* (fields) surveyed so far. Few of these finds are diagnostic (see Figure 20: 1 from Duboke and Figure 20: 3 from Zace). We also note a coin of Valens, AD 364-378, mint of Siscia, found on Pržina (RIC IX 5b). As a ‘background noise’, they are an excellent indicator of the use of fertile terra rossa soils and adjacent areas through all periods of prehistory and early history.

Viewshed

The two most prominent hilltop locations examined are Sozanj and Kaštel. Both sites are naturally defended and

overlook large expanses of the island. In order to understand the factors influencing the choice of these locations, we performed a viewshed analysis for each position. Some interesting aspects emerged. Sozanj appears, above all, to control sea access to the island from the north, west, and southwest (Figure 22). In particular, along the north coast, all major bays and potential harbors can be overseen. Inland, the viewshed is extensive on karst and hills, but only limited on agricultural land. Kaštel has a different viewshed (Figure 23): again, there is control of the north and northeast, but not of the west and southwest towards the open sea. On the other hand, however, Kaštel dominates larger parts of the inland fertile zones on Lastovo polje, Pržina and Lokavje. The two sites are thus complementary in terms of strategic control of land and access to the island.

Line-of-sight

Besides Novi hum in the northeast, Kaštel is the only location with a line-of-sight across the island to the Skrivena luka area in the south. In order to simulate overall strategic control of the island and its maritime access routes, more hilltops need to be included. For the line-of-sight analysis (Figure 24), we added potential sites on Novi hum (210m a.s.l.), Brdo (211m a.s.l.) above Skrivena luka, Kamenice (104m a.s.l.) in the far south and Mostni vrh (135m a.s.l.) in the west (both are former military zones), and Dragovode (147m a.s.l.) dominating Ubli, Nižno polje and VINO polje.

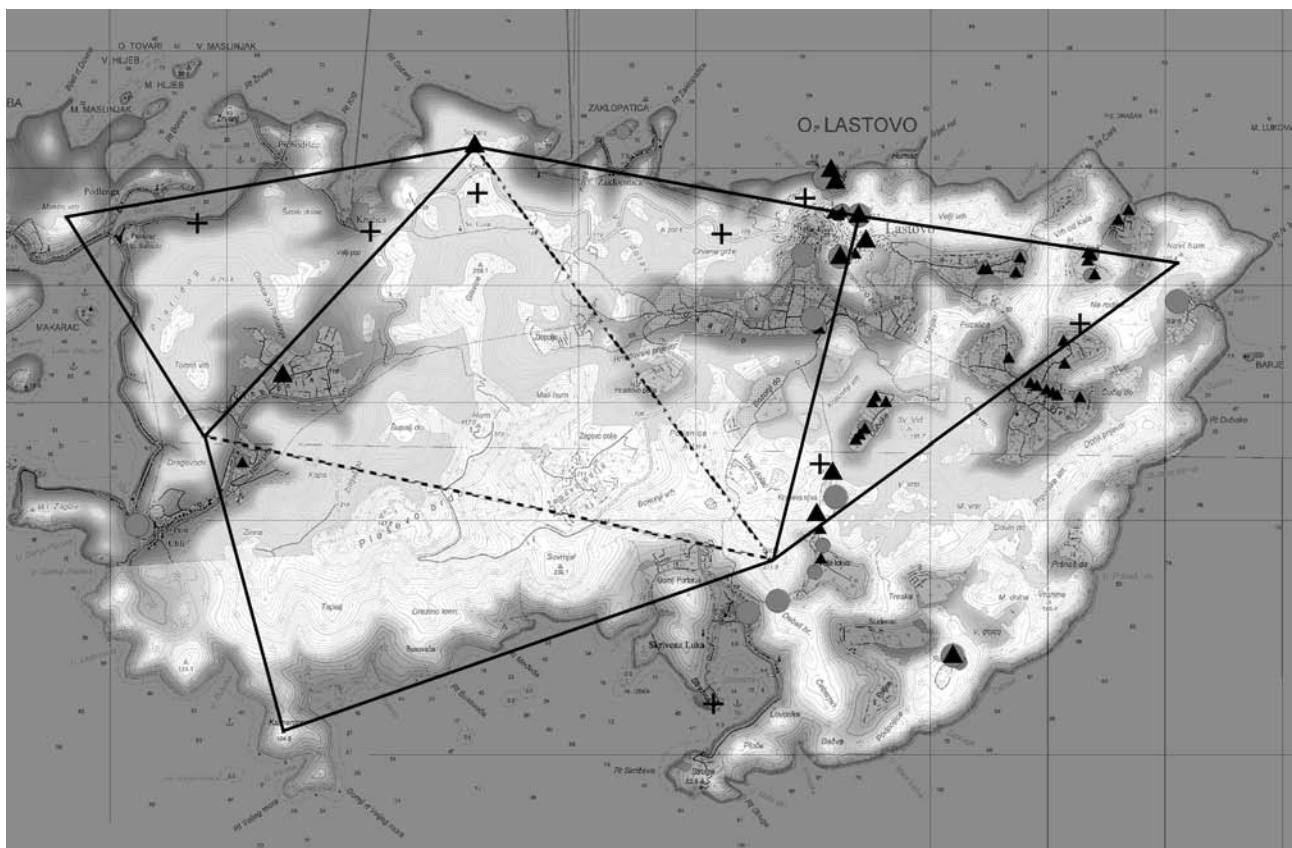


Figure 24. Overview of sites (see Figure 25) and line-of-sight analysis combining ascertained (Sozanj, Kaštel) and hypothetical hilltop situations (dotted lines: no line-of-sight). Elaboration by M. Sauerbier, ETHZ.

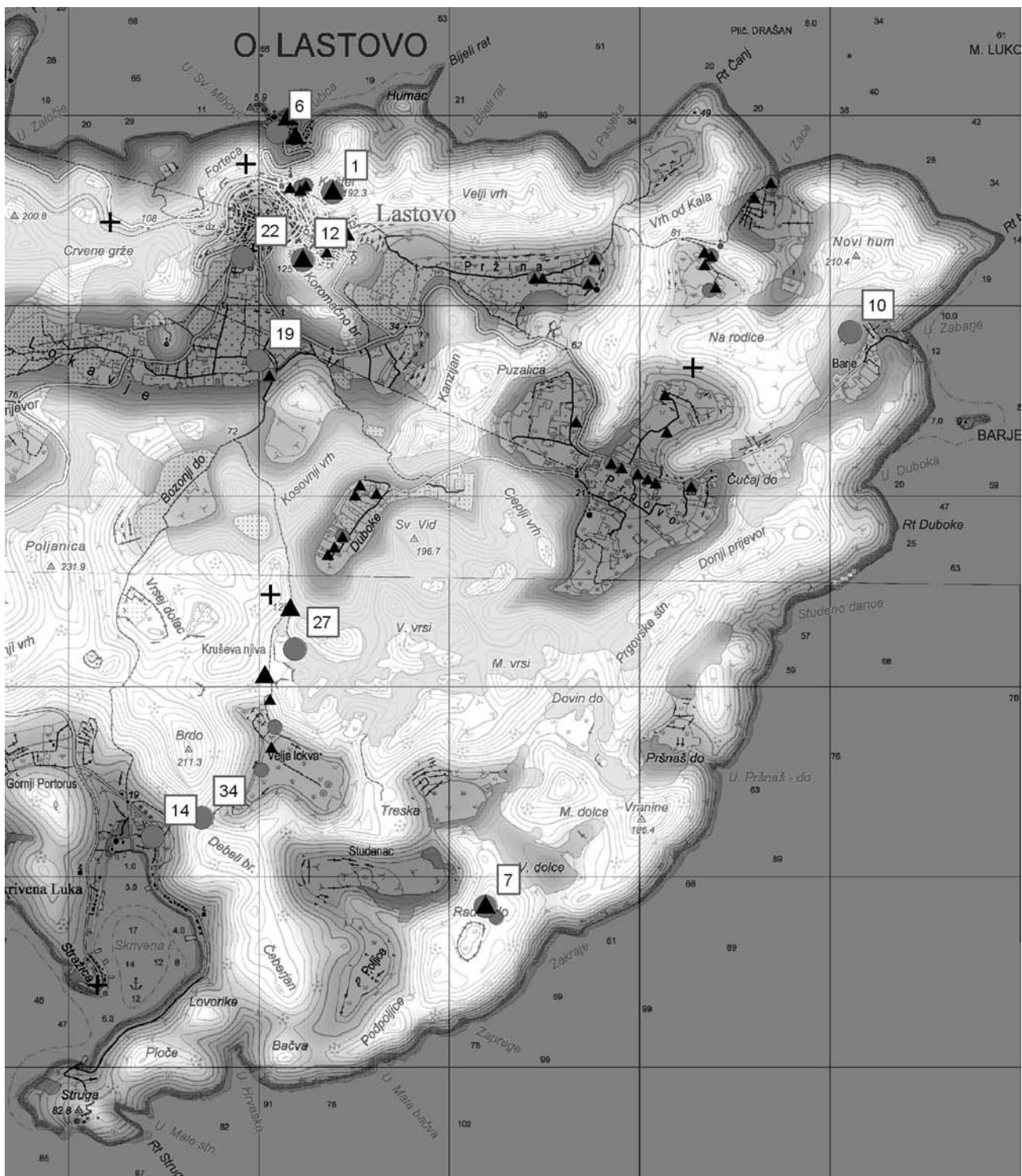


Figure 25. Lastovo Island, eastern part: sites (large triangles: Prehistoric; large dots: Greco-Roman; crosses: unknown) and 'background noise' (small triangles and dots). Numbers refer to project database (see text). Elaboration by Ph. Della Casa, UZH and M. Sauerbier, ETHZ.

Clearly, these hilltop locations deserve major attention in future research.

Settlement patterns

Besides the macro scale, GIS analysis was also performed

on the micro scale, focusing on the topographic location of various categories of sites, and on their chronological setting. The results are visualized for the eastern part of the island, the most thoroughly investigated so far (Figure 25). There is an interesting sequence of find spots along the old track (*stari put*) connecting Lastovo polje and Skrivena

luka. Looking at the locations of identified prehistoric sites, we note – along with the site in Lučica bay [6] – a preference for elevated situations: Lastovo Kaštel [1] (but also areas of the present village), Koromačno [12], and above Kruševa nijva [27]. As previously noted, Rača Cave [7] makes an exception. However, prehistoric stray finds (flint, pottery) are present in all of the *polja*: near the *lokva* in Lastovo polje [19], in Pržina, Kal and Zace to the west, in Prgovo, Duboke and Velja lokva to the south. We do not know yet where the corresponding settlements are to be located.

By comparison, Roman villas (all of them undated so far) are situated on the edges of the fertile fields, in Lastovo polje [22], Barje [10], Kruševa nijva [27] and Skrivena luka [14]. Kaštel hill [1] must have played a particular role in the Hellenistic settlement organization, associated – as in earlier times – with the harbor at Lučica and Sveti Mihovil [6]. As the settlement on Kaštel seems to stop in post-Augustean times, along with the occupation in Rača Cave, a shift in settlement (and social) organization can be hypothesized for the 1st century AD, corroborating written sources on the history of the island. However, dated assemblages from the Roman villas would be needed to enlarge the argument. Furthermore, there are no dated assemblages known from Ubli so far, but it is probable that the shift from Lastovo/Lučica to Ubli/Veljo lago took place about the same time.

Summary and prospect

The research described herein comprised the initial effort to compile multi-period archaeological and geographical data on Lastovo. The results of our approach show that field survey along with test excavations can provide a valuable data set from which future studies can be launched.

Although the test excavations were limited in scope, they did reveal a large quantity of archaeological materials from various prehistoric and protohistoric sites and periods. The research has contributed to the material knowledge and chronology of the island, as well as the wider eastern Adriatic region. Nearly all fields yielded surface finds, and while these can only be defined as surface scatter, they do indicate prehistoric and protohistoric activities across the island. Numerous archaeological sites that are surely related to cross-island communication are located along the *stari put* (old road) that leads across the island, from Lastovo village to Skrivena luka.

Regarding site topography, we were able to indicate possible settlement patterns and to illustrate different settlement trends from prehistory through Roman times. Particular attention was paid to viewshed analysis, inter-site visibility, dominant site positions on the island, and their relationship to maritime connections, contemporaneous sites, and proximity to arable lands. However, there are many areas of the island that still have to be explored and

surveyed, and the marine archaeology component has yet to be systematically examined.

Eventually, a joint database (including Sušac, Korčula and Pelješac Peninsula), in conjunction with the aforementioned AIP, would enable the collective study of a large group of islands. Such a database would be unique to Mediterranean archaeological research, and would encompass data gathered from more than ten islands and nearby coastal sites.

Acknowledgements

Major funding for the Lastovo research (Augusta Insula Project), as part of a larger project entitled 'Prehistory of the Southern Dalmatian Archipelago', is owed to the Foundation for Scientific Research at the University of Zurich. The International Research and Exchanges Board (IREX) granted a Short-Term Travel Grant that provided valuable support to the preliminary 2001 field season. We are very grateful for logistical support from the *Uprava za zaštitu kulturne i prirodne bastine - Konzervatorski odjel Dubrovnik*, the *Centar za kulturu, Općina Vela Luka, Korčula*, and the *Općina Lastovo*. Radiocarbon dates were prepared at the Institute of Geography, University of Zurich, and run using AMS technique at the Institute of Particle Physics of ETH Zurich. Martin Sauerbier from ETHZ was extremely helpful in setting up our database and running GIS analyses on ArcGIS. Conservation of glass and metal was done by Ivo Donelli, Art Academy in Split. Photos of glass and metal finds are by photographer Tonči Seser, Archaeological Museum Split. We are grateful to custodian of coins, Maja Bonačić, from the Archaeological Museum Split, for her help in the determination of coins. Ante Milošević from the Museum of Croatian Archaeological Monuments in Split supported the team with valuable information on the island. Nissan AG of Switzerland kindly provided 4x4 vehicles that proved vital for the 2001 and 2003 seasons, while Ivan 'Amerikanac' Šegedin (Korčula) provided a transport van for the 2007 season. Special thanks to family Jurica in Zaklopatica, for providing excellent accommodation and logistical support to the team, and to family Padovan-Grano in Vela Luka. Over the various seasons, the following persons also participated in the Lastovo field research: Zoe Bass, Dan Bee, Seth Button, Renata Huber, Emanuela Jochum-Zimmermann, Kristin Kruse, Daniel Möckli, Thomas Reitmaier, Dan Shoup, and Filomena Sirovica.

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